

# Switch Mode Power Supply S8VS

## 15/30-W Models

**Compact, Thin Power Supplies That Mount Just About Anywhere to Contribute to Control Panel Downsizing**

- Compact, thin size: 22.5 × 85 × 96.5 mm (W × H × D).
- Three mounting directions (standard, horizontal, facing horizontal).
- Mounting directly onto the panel is possible.
- Safety standards: UL508/60950-1/1604, CSA C22.2 No. 14/60950-1/213, EN50178 (= VDE0160), EN60950-1 (= VDE0805).



## 60/90/120/180/240-W Models

**New Models with Total Run Time Monitor in Addition to Models with Maintenance Forecast Monitor**

- Compact size: 40 × 95 mm (W × H) (60-W Models).
- Status displayed on 3-digit, 7-segment display.
- Safety standards: UL508/60950, CSA C22.2 No. 14/60950, EN50178 (= VDE0160), EN60950 (= VDE0805).



## Features Common to All Models

- Mount to DIN-rail.
- Lead-free solder.

# Model Number Structure

## Model Number Legend

S8VS-         
1 2 3

### 1. Power Ratings

- 015: 15 W
- 030: 30 W
- 060: 60 W
- 090: 90 W
- 120: 120 W
- 180: 180 W
- 240: 240 W

### 2. Output voltage

- 05: 5 V
- 12: 12 V
- 24: 24 V

### 3. Configuration

#### 15-W, 30-W Models

None: Standard

#### 60-W Models

None: Standard

A: With maintenance forecast monitor

B: With total run time monitor

#### 90-W, 120-W, 180-W, 240-W Models

None: Standard

A: With maintenance forecast monitor and undervoltage alarm (transistor (sinking))

B: With total run time monitor and undervoltage alarm (transistor (sinking))

AP: With maintenance forecast monitor and undervoltage alarm (transistor (sourcing))

BP: With total run time monitor and undervoltage alarm (transistor (sourcing))

## Ordering Information

| Power ratings | Input Voltage  | Output voltage | Output current | Alarm output | Model number             |
|---------------|----------------|----------------|----------------|--------------|--------------------------|
| 15 W          | 100 to 240 VAC | 5 V            | 2.0 A          | ---          | S8VS-01505 (See note 1.) |
|               |                | 12 V           | 1.2 A          | ---          | S8VS-01512               |
|               |                | 24 V           | 0.65 A         | ---          | S8VS-01524               |
| 30 W          |                | 5 V            | 4.0 A          | ---          | S8VS-03005 (See note 2.) |
|               |                | 12 V           | 2.5 A          | ---          | S8VS-03012               |
|               |                | 24 V           | 1.3 A          | ---          | S8VS-03024               |
| 60 W          |                | 24 V           | 2.5 A          | ---          | S8VS-06024               |
|               |                |                |                | Sinking      | S8VS-06024A              |
|               |                |                |                | Sourcing     | S8VS-06024B              |
| 90 W          | 100 to 240 VAC | 3.75 A         | ---            | S8VS-09024   |                          |
|               |                |                | Sinking        | S8VS-09024A  |                          |
|               |                |                | Sourcing       | S8VS-09024AP |                          |
|               |                |                | Sinking        | S8VS-09024B  |                          |
|               |                |                | Sourcing       | S8VS-09024BP |                          |
| 120 W         |                | 5 A            | ---            | S8VS-12024   |                          |
|               |                |                | Sinking        | S8VS-12024A  |                          |
|               |                |                | Sourcing       | S8VS-12024AP |                          |
|               |                |                | Sinking        | S8VS-12024B  |                          |
| 180 W         |                | 7.5 A          | ---            | S8VS-18024   |                          |
|               |                |                | Sinking        | S8VS-18024A  |                          |
|               |                |                | Sourcing       | S8VS-18024AP |                          |
|               |                |                | Sinking        | S8VS-18024B  |                          |
| 240 W         |                | 10 A           | ---            | S8VS-24024   |                          |
|               |                |                | Sinking        | S8VS-24024A  |                          |
|               | Sourcing       |                | S8VS-24024AP   |              |                          |
|               | Sinking        |                | S8VS-24024B    |              |                          |
| 240 W         | 10 A           | 10 A           | Sourcing       | S8VS-24024BP |                          |
|               |                |                | Sinking        | S8VS-24024A  |                          |
|               |                |                | Sourcing       | S8VS-24024AP |                          |
|               |                |                | Sinking        | S8VS-24024B  |                          |
| 240 W         | 10 A           | 10 A           | Sourcing       | S8VS-24024BP |                          |
|               |                |                | Sinking        | S8VS-24024A  |                          |
|               |                |                | Sourcing       | S8VS-24024AP |                          |
|               |                |                | Sinking        | S8VS-24024B  |                          |

**Note:** 1. The output capacity of the S8VS-01505 is 10 W.

2. The output capacity of the S8VS-03005 is 20 W.

# Specifications

## ■ Ratings/Characteristics

| Item                                    | Power ratings                                  |   | 15 W   |   | 30 W   |   |
|---|--|---|--|---|--|---|
|   | Type   |   | Standard   |   | Standard   |   |
| Efficiency (typical)                    | 5-V models                                     |   | 72% min. (76% typ.)  |   | 70% min. (76% typ.)  |   |
|   | 12-V models                                    |   | 74% min. (79% typ.)  |   | 76% min. (83% typ.)  |   |
|   | 24-V models                                    |   | 77% min. (81% typ.)  |   | 80% min. (85% typ.)  |   |
| Input                                   | Voltage  |   | 100 to 240 VAC (85 to 264 VAC)   |   |  |   |
|   | Frequency                                      |   | 50/60 Hz (47 to 450 Hz)  |   |  |   |
|   | Current  | 100 V input   | 0.45 A max.  |   | 0.9 A max.   |   |
|   |  | 200 V input   | 0.25 A max.  |   | 0.6 A max.   |   |
|   |  | 230 V input   | 5 V: (0.14 A typ.), 12 V/24 V (0.19 A typ.)  |   | 5 V: (0.27 A typ.), 12 V/24 V (0.37 A typ.)                            |   |
|   | Power factor                                   |   | ---  |   |  |   |
|   | Harmonic current emissions                     |   | Conforms to EN61000-3-2  |   |  |   |
|   | Leakage current                                | 100 V input   | 0.5 mA max.  |   |  |   |
|   |  | 200 V input   | 1.0 mA max.  |   |  |   |
|   |  | 230 V input   | 5 V/12 V/24 V: (0.30 mA typ.)  |   | 5 V/12 V/24 V: (0.32 mA typ.)  |   |
| Inrush current (See note 1.)            | 100 V input                                    | 25 A max. (20 A typ.) (for a cold start at 25°C)  |  |   |  |   |
|   | 200 V input                                    | 50 A max. (40 A typ.) (for a cold start at 25°C)  |  |   |  |   |
|   | 230 V input                                    | 5 V/12 V/24 V: (29 A typ.) (See note 6.)  |  | 5 V/12 V/24 V: (40 A typ.) (See note 6.)                          |  |   |
| Output                                  | Voltage adjustment range (See note 2.)         |   | -10% to 15% (with V.ADJ) (guaranteed)  |   |  |   |
|   | Ripple   |   |  | 2.0% (p-p) max. (at rated input/output voltage)                   |  |   |
|   |  | f=20MHz measuring   | 5 V: (0.70%(p-p) typ.), 12 V:(0.48%(p-p) typ.), 24 V:(0.25%(p-p) typ.)   |   | 5 V: (0.70%(p-p) typ.), 12 V:(0.52%(p-p) typ.), 24 V:(0.19%(p-p) typ.) |   |
|   |  | f=100MHz measuring  | 5 V: (0.86%(p-p) typ.), 12 V:(0.56%(p-p) typ.), 24 V:(0.32%(p-p) typ.)   |   | 5 V: (0.80%(p-p) typ.), 12 V:(0.58%(p-p) typ.), 24 V:(0.21%(p-p) typ.) |   |
|   | Input variation influence                      |   | 0.5% max. (at 85 to 264 VAC input, 100% load)  |   |  |   |
|   | Load variation influence (rated input voltage) |   | 2.0% max. (5 V), 1.5% max. (12 V, 24 V), (with rated input, 0 to 100% load)  |   |  |   |
|   | Temperature variation influence                |   | 0.05%/°C max.  |   |  |   |
|   | Start up time (See note 1 and 7.)              |   |  | 100 ms max. (at rated input/output voltage)                       |  | 1,000 ms max. (at rated input/output voltage)   |
|   |  |   |  | 5 V: (6 ms typ.), 12 V: (12 ms typ.), 24 V: (18 ms typ.)          |  | 5 V/12 V/24 V: (240 ms typ.)  |
|   | Hold time (See note 1.)                        |   |  | 20 ms min. (at rated input/output voltage)                        |  |   |
|   |  | at 100% load  |  | 5 V: (328 ms typ.), 12V: (251 ms typ.), 24 V: (243 ms typ.)       |  | 5 V: (299 ms typ.), 12 V: (217 ms typ.), 24 V: (210 ms typ.)                              |
|   | Additional functions                           | Overload protection (See note 1.)   |  | 105% to 160% of rated load current, voltage drop, automatic reset |  | 105% to 160% of rated load current, voltage drop, intermittent operation, automatic reset |
|   |  | Overvoltage protection (See note 1.)  |  | Yes (a zener diode clamp) (See note 3.)                           |  | Yes (See note 4.)   |
| Output voltage indication               |  | No  |  |   |  |   |
| Output current indication               |  | No  |  |   |  |   |
| Peak-hold current indication            |  | No  |  |   |  |   |
| Maintenance forecast monitor indication |  | No  |  |   |  |   |
| Maintenance forecast monitor output     |  | No  |  |   |  |   |
| Total run time monitor indication       |  | No  |  |   |  |   |
| Total run time monitor output           |  | No  |  |   |  |   |
| Undervoltage alarm indication           |  | Yes (color: red)  |  |   |  |   |
| Undervoltage alarm output               |  | No  |  |   |  |   |
| Parallel operation                      |  | No  |  |   |  |   |
| Series operation                        |  | Models with 24-V output: Possible for up to 2 Power Supplies (with external diode)<br>Models with 5- or 12-V output: Not possible |  |   |  |   |
| Other                                   | Operating ambient temperature                  |   | Refer to the derating curve in <i>Engineering Data</i> . (with no icing or condensation)   |   |  |   |
|   | Storage temperature                            |   | -25 to 65°C  |   |  |   |
|   | Operating ambient humidity                     |   | 25% to 85% (Storage humidity: 25% to 90%)  |   |  |   |
|   | Dielectric strength                            |   | 3.0 kVAC for 1 min. (between all inputs and outputs; detection current: 20 mA)<br>2.0 kVAC for 1 min. (between all inputs and PE terminals; detection current: 20 mA)<br>1.0 kVAC for 1 min. (between all outputs and PE terminals; detection current: 20 mA)                        |   |  |   |
|   | Insulation resistance                          |   | 100 MΩ min. (between all outputs and all inputs/ PE terminals) at 500 VDC  |   |  |   |
|   | Vibration resistance                           |   | 10 to 55 Hz, 0.375-mm single amplitude for 2 h each in X, Y, and Z directions<br>10 to 150 Hz, 0.35-mm single amplitude (5 G max.) for 80 min. each in X, Y, and Z directions  |   |  |   |
|   | Shock resistance                               |   | 150 m/s <sup>2</sup> , 3 times each in ±X, ±Y, and ±Z directions   |   |  |   |
|   | Output indicator                               |   | Yes (color: green)   |   |  |   |
|   | EMI  | Conducted Emissions   | Conforms to EN61204-3 EN55011 Class B and based on FCC Class A   |   |  |   |
|   |  | Radiated Emissions  | Conforms to EN61204-3 EN55011 Class B  |   |  |   |
|   | EMS  |   | Conforms to EN61204-3 high severity levels   |   |  |   |
|   | Approved standards                             |   | UL: UL508 (Listing, Class 2: Per UL1310), UL60950-1, UL1604 (Class I/Division2)<br>cUL: CSA C22.2 No.14 (Class 2), No.60950-1, No.213 (Class I/Division2)<br>EN/VDE: EN50178 (=VDE0160), EN60950-1 (=VDE0805)<br>SELV (EN60950/EN50178/UL60950-1)<br>According to VDE0106/P100, IP20 |   |  |   |
|   | Weight   |   | 160 g max.   |   | 180 g max.   |   |

- Note:**
1. Refer to the *Engineering Data* section on page B-21 for details.
  2. If the V.ADJ adjuster is turned, the voltage will increase by more than +15% of the voltage adjustment range. When adjusting the output voltage, confirm the actual output voltage from the Power Supply and be sure that the load is not damaged.
  3. The overvoltage protection of the S8VS-015□□ uses a zener diode clamp. If the internal feedback circuit is destroyed by any chance, the load may be destroyed by the clamped output voltage (approx. 140% to 190% of the rated output voltage).
  4. To reset the protection, turn OFF the power supply for three minutes or longer and then turn the power supply back ON.
  5. The typical values indicate the values for an input condition of 230 VAC. All items are measured at a frequency of 50 Hz.
  6. The inrush current circuits do not differ for voltage specifications. Therefore, the typical values are the data values for 24-V models.
  7. The circuit forms are different, so the start up time is shorter only when using a 15-W power rating.

# Specifications

## ■ Ratings/Characteristics

| Item  | Power ratings<br>Type  | 60 W  |   |   | 90 W   |                                 |                           |  |
|---|--|---|---|---|--|---------------------------------|---------------------------|--|
|   |  | Standard  | Maintenance<br>forecast monitor   | Total run time<br>monitor   | Standard   | Maintenance<br>forecast monitor | Total run time<br>monitor |  |
| Efficiency (typical)                                  |  | 78% min. (86% typ.)   |   |   | 80% min. (87% typ.)  |                                 |                           |  |
| Input   | Voltage  | 100 to 240 VAC (85 to 264 VAC)  |   |   |  |                                 |                           |  |
|   | Frequency  | 50/60 Hz (47 to 450 Hz)   |   |   |  |                                 |                           |  |
|   | Current  | 100 V input   | 1.7 A max.  |   |  | 2.3 A max.                      |                           |  |
|   |  | 200 V input   | 1.0 A max.  |   |  | 1.4 A max.                      |                           |  |
|   |  | 230 V input   | (0.7 A typ.)  |   |  | (0.9 A typ.)                    |                           |  |
|   | Power factor   | ---   |   |   |  |                                 |                           |  |
|   | Harmonic current emissions   | Conforms to EN61000-3-2   |   |   |  |                                 |                           |  |
|   | Leakage current  | 100 V input   | 0.5 mA max.   |   |  |                                 |                           |  |
|   |  | 200 V input   | 1.0 mA max.   |   |  |                                 |                           |  |
|   |  | 230 V input   | (0.40 mA typ.)  |   |  | (0.35 mA typ.)                  |                           |  |
| Inrush current<br>(See note 1.)                       | 100 V input  | 25 A max. (for a cold start at 25°C)  |   |   |  |                                 |                           |  |
|   | 200 V input  | 50 A max. (for a cold start at 25°C)  |   |   |  |                                 |                           |  |
|   | 230 V input  | (47 A typ.)   |   |   | (38 A typ.)  |                                 |                           |  |
| Output  | Voltage adjustment range (See note 2.)   | -10% to 15% (with V.ADJ.) (guaranteed)  |   |   |  |                                 |                           |  |
|   | Ripple   | 2.0% (p-p) max. (at rated input/output voltage)   |   |   |  |                                 |                           |  |
|   |  | f=20MHz measuring   | (0.29% (p-p) typ.)  |   |  | (0.38% (p-p) typ.)              |                           |  |
|   | f=100MHz measuring   | (0.32% (p-p) typ.)  |   |   | (0.42% (p-p) typ.)   |                                 |                           |  |
|   | Input variation influence  | 0.5% max. (at 85 to 264 VAC input, 100% load)   |   |   |  |                                 |                           |  |
|   | Load variation influence (rated input voltage)   | 1.5% max. (with rated input, 0 to 100% load)  |   |   |  |                                 |                           |  |
|   | Temperature variation influence  | 0.05%/°C max.   |   |   |  |                                 |                           |  |
|   | Start up time (See note 1.)  | 1,000 ms max. (at rated input/output voltage)   |   |   |  |                                 |                           |  |
|   |  | (270 ms typ.)   |   |   | (260 ms typ.)  |                                 |                           |  |
|   | Hold time (See note 1.)  | 20 ms min. (at rated input/output voltage)  |   |   |  |                                 |                           |  |
|   |  | at 100% load  | (220 ms typ.)   |   |  | (190 ms typ.)                   |                           |  |
|   | Additional functions   | Overload protection (See note 1.)   | 105% to 160% of rated load current, voltage drop, intermittent, automatic reset |   |  |                                 |                           |  |
|   |  | Overvoltage protection (See notes 1 and 3.)   | Yes   |   |  |                                 |                           |  |
| Output voltage indication (See note 4.)               |  | No  | Yes (selectable) (See note 5.)  |   | No   | Yes (selectable) (See note 5.)  |                           |  |
| Output current indication (See note 4.)               |  | No  | Yes (selectable) (See note 6.)  |   | No   | Yes (selectable) (See note 6.)  |                           |  |
| Peak-hold current indication (See note 4.)            |  | No  | Yes (selectable) (See note 7.)  |   | No   | Yes (selectable) (See note 7.)  |                           |  |
| Maintenance forecast monitor indication (See note 4.) |  | No  | Yes (selectable)  | No  | No   | Yes (selectable)                | No                        |  |
| Maintenance forecast monitor output                   |  | No  |   |   | Yes (open collector output), 30 VDC max., 50 mA max. (See note 8.) |                                 | No                        |  |
| Total run time monitor indication (See note 4.)       |  | No  | Yes (selectable)  |   | No   | Yes (selectable)                |                           |  |
| Total run time monitor output                         |  | No  |   |   | Yes (open collector output), 30 VDC max., 50 mA max. (See note 8.) |                                 | Yes (selectable)          |  |
| Undervoltage alarm indication (See note 4.)           |  | No  | Yes (selectable)  |   | No   | Yes (selectable)                |                           |  |
| Undervoltage alarm output terminals                   |  | No  |   |   | Yes (open collector output), 30 VDC max., 50 mA max. (See note 8.) |                                 |                           |  |
| Parallel operation                                    |  | No  |   |   |  |                                 |                           |  |
| Series operation                                      |  | Yes for up to 2 Power Supplies (with external diode)  |   |   |  |                                 |                           |  |
| Other   | Operating ambient temperature  | Refer to the derating curve in <i>Engineering Data</i> . (with no icing or condensation)            |   |   |  |                                 |                           |  |
|   | Storage temperature  | -25 to 65°C   |   |   |  |                                 |                           |  |
|   | Operating ambient humidity   | 25% to 85% (Storage humidity: 25% to 90%)   |   |   |  |                                 |                           |  |
|   | Dielectric strength  | 3.0 kVAC for 1 min. (between all inputs and outputs/ alarm outputs; detection current: 20 mA)       |   |   |  |                                 |                           |  |
|   |  | 2.0 kVAC for 1 min. (between all inputs and PE terminals; detection current: 20 mA)                 |   |   |  |                                 |                           |  |
|   |  | 1.0 kVAC for 1 min. (between all outputs/ alarm outputs and PE terminals; detection current: 20 mA) |   |   |  |                                 |                           |  |
|   |  | 500 VAC for 1 min. (between all outputs and alarm outputs; detection current: 20 mA)                |   |   |  |                                 |                           |  |
|   | Insulation resistance  | 100 MΩ min. (between all outputs/ alarm outputs and all inputs/ PE terminals) at 500 VDC            |   |   |  |                                 |                           |  |
|   | Vibration resistance   | 10 to 55 Hz, 0.375-mm single amplitude for 2 h each in X, Y, and Z directions                       |   |   |  |                                 |                           |  |
|   |  | 10 to 150Hz, 0.35-mm single amplitude (5 G max.) for 80 min each in-X, Y, and Z directions          |   |   |  |                                 |                           |  |
|   | Shock resistance   | 150 m/s <sup>2</sup> , 3 times each in ±X, ±Y, and ±Z directions                                    |   |   |  |                                 |                           |  |
|   | Output indicator   | Yes (color: green)  |   |   |  |                                 |                           |  |
|   | EMI  | Conducted Emissions   | Conforms to EN61204-3 EN55011 Class A and based on FCC Class A                  |   |  |                                 |                           |  |
| Radiated Emissions                                    |  | Conforms to EN61204-3 EN55011 Class B (See note 9.)   |   |   |  |                                 |                           |  |
| EMS   | Conforms to EN61204-3 high severity levels   |   |   |   |  |                                 |                           |  |
| Approved standards                                    | UL: UL508 (Listing, Class 2: Per UL1310), UL60950<br>cUL: CSA C22.2 No.14 (Class 2), No.60950<br>EN/VDE: EN50178 (=VDE0160), EN60950 (=VDE0805)<br>SELV (EN60950/EN50178/UL60950-1)<br>According to VDE0106/P100, IP20 |   |   | UL: UL508 (Listing), UL60950<br>cUL: CSA C22.2 No.14, No.60950<br>EN/VDE: EN50178 (=VDE0160), EN60950 (=VDE0805)<br>SELV (EN60950/EN50178/UL60950-1)<br>According to VDE0106/P100, IP20 |  |                                 |                           |  |
| Weight  | 330 g max.   |   |   | 490 g max.  |  |                                 |                           |  |

- Note:
1. Refer to the *Engineering Data* section on page B-21 for details.
  2. If the V.ADJ adjuster is turned, the voltage will increase by more than +15% of the voltage adjustment range (by more than +10% for 240-W models). When adjusting the output voltage, confirm the actual output voltage from the Power Supply and be sure that the load is not damaged.
  3. To reset the protection, turn OFF the power supply for three minutes or longer and then turn the power supply back ON.
  4. Displayed on 7-segment LED. (character height: 8 mm)
  5. Resolution of output voltage indication: 0.1 V, Precision of output voltage indication: ±2% (percentage of output voltage value, ±1 digit)
  6. Resolution of output current indication: 0.1 A; Precision of output current indication: ±5% F.S. ±1 digit max. (specified by rated output voltage)
  7. Resolution of peak-hold current indication: 0.1 A; Precision of peak-hold current indication: ±5% F.S. ±1 digit max. (specified by rated output voltage);  
Signal width required for peak-hold current: 20 ms
  8. A Type and B Type: Sinking, AP Type and P Type: Sourcing
  9. To ensure the emission rating, a ferrite ring core should be used in all cabling (TDK HF60T, HF70RH or equivalent model).
  10. The typical values indicate the values for an input condition of 230 VAC. All items are measured at a frequency of 50 Hz.

| Item  | Power ratings<br>Type                          | 120 W  |   |   | 180 W                          |  |                        | 240 W                          |  |   |                                |  |
|---|--|--|---|---|--------------------------------|--|------------------------|--------------------------------|--|---|--------------------------------|--|
|   |  | Standard   | Maintenance forecast monitor  | Total run time monitor  | Standard                       | Maintenance forecast monitor                                       | Total run time monitor | Standard                       | Maintenance forecast monitor                                       | Total run time monitor  |                                |  |
| Efficiency (typical)                                  |  | 80% min. (87% typ.)                                  |   |   | 80% min. (88% typ.)            |  |                        | 80% min. (86% typ.)            |  |   |                                |  |
| Input   | Voltage  | 100 to 240 VAC (85 to 264 VAC)                       |   |   |                                |  |                        |                                |  |   |                                |  |
|   | Frequency                                      | 50/60 Hz (47 to 63 Hz)                               |   |   |                                |  |                        |                                |  |   |                                |  |
|   | Current  | 100 V input  | 1.9 A max.  |   |                                | 2.9 A max.   |                        |                                | 3.8 A max.   |   |                                |  |
|   |  | 200 V input  | 1.1 A max.  |   |                                | 1.6 A max.   |                        |                                | 2.0 A max.   |   |                                |  |
|   |  | 230 V input  | (0.6 A typ.)  |   |                                | (0.9 A typ.)   |                        |                                | (1.2 A typ.)   |   |                                |  |
|   | Power factor                                   | 0.95 min.  |   |   |                                |  |                        |                                |  |   |                                |  |
|   | Harmonic current emissions                     |  | Conforms to EN61000-3-2   |   |                                |  |                        |                                |  |   |                                |  |
|   | Leakage current                                | 100 V input  | 0.5 mA max.   |   |                                |  |                        |                                |  |   |                                |  |
|   |  | 200 V input  | 1.0 mA max.   |   |                                |  |                        |                                |  |   |                                |  |
|   |  | 230 V input  | (0.43 mA typ.)  |   |                                | (0.45 mA typ.)   |                        |                                | (0.45 mA typ.)   |   |                                |  |
| Inrush current (See note 1.)                          | 100 V input                                    | 25 A max. (for a cold start at 25°C)                 |   |   |                                |  |                        |                                |  |   |                                |  |
|   | 200 V input                                    | 50 A max. (for a cold start at 25°C)                 |   |   |                                |  |                        |                                |  |   |                                |  |
|   | 230 V input                                    | (41 mA typ.)   |   |   | (34 mA typ.)                   |  |                        | (39 mA typ.)                   |  |   |                                |  |
| Output  | Voltage adjustment range (See note 2.)         |  | -10% to 15% (with V.ADJ) (guaranteed)   |   |                                |  |                        |                                | ±10% (with V.ADJ) (guaranteed)                                     |   |                                |  |
|   | Ripple   |  | 2.0% (p-p) max. (at rated input/output voltage)   |   |                                |  |                        |                                |  |   |                                |  |
|   | f=20MHz measuring                              | (0.66%(p-p) typ.)                                    |   |   | (0.45%(p-p) typ.)              |  |                        | (0.13%(p-p) typ.)              |  |   |                                |  |
|   |  | (0.67%(p-p) typ.)                                    |   |   | (0.52%(p-p) typ.)              |  |                        | (0.21%(p-p) typ.)              |  |   |                                |  |
|   | Input variation influence                      |  | 0.5% max. (at 85 to 264 VAC input, 100% load)   |   |                                |  |                        |                                |  |   |                                |  |
|   | Load variation influence (rated input voltage) |  | 1.5% max. (with rated input, 0 to 100% load)  |   |                                |  |                        |                                |  |   |                                |  |
|   | Temperature variation influence                |  | 0.05%/°C max.   |   |                                |  |                        |                                |  |   |                                |  |
|   | Start up time (See note 1.)                    |  | 1,000 ms max. (at rated input/output voltage)   |   |                                |  |                        |                                |  |   |                                |  |
|   | Hold time (See note 1.)                        | (380 ms typ.)  |   |   | (530 ms typ.)                  |  |                        | (780 ms typ.)                  |  |   |                                |  |
|   |  | at 100% load   |   | (60 ms typ.)  |                                |  | (60 ms typ.)           |                                |  | (30 ms typ.)  |                                |  |
|   | Additional functions                           | Overload protection (See note 1.)                    |   | 105% to 160% of rated load current, voltage drop, intermittent, automatic reset |                                |  |                        |                                |  | 105% to 160% of rated load current, voltage drop, automatic reset |                                |  |
|   |  | Overvoltage protection (See notes 1 and 3.)          |   | Yes   |                                |  |                        |                                |  |   |                                |  |
|   |  | Output voltage indication (See note 4.)              |   | No  | Yes (selectable) (See note 5.) |  | No                     | Yes (selectable) (See note 5.) |  | No  | Yes (selectable) (See note 5.) |  |
| Output current indication (See note 4.)               |  | No   | Yes (selectable) (See note 6.)  |   | No                             | Yes (selectable) (See note 6.)                                     |                        | No                             | Yes (selectable) (See note 6.)                                     |   |                                |  |
| Peak-hold current indication (See note 4.)            |  | No   | Yes (selectable) (See note 7.)  |   | No                             | Yes (selectable) (See note 7.)                                     |                        | No                             | Yes (selectable) (See note 7.)                                     |   |                                |  |
| Maintenance forecast monitor indication (See note 4.) |  | No   | Yes (selectable)  | No  | No                             | Yes (selectable)   | No                     | No                             | Yes (selectable)   | No  |                                |  |
| Maintenance forecast monitor output                   |  | No   | Yes (open collector output), 30 VDC max., 50 mA max. (See note 8.)  |   | No                             | Yes (open collector output), 30 VDC max., 50 mA max. (See note 8.) |                        | No                             | Yes (open collector output), 30 VDC max., 50 mA max. (See note 8.) |   |                                |  |
| Total run time monitor indication (See note 4.)       |  | No   | Yes (selectable)  |   | No                             | Yes (selectable)   |                        | No                             | Yes (selectable)   |   |                                |  |
| Total run time monitor output                         |  | No   | Yes (open collector output), 30 VDC max., 50 mA max. (See note 8.)  |   | No                             | Yes (open collector output), 30 VDC max., 50 mA max. (See note 8.) |                        | No                             | Yes (open collector output), 30 VDC max., 50 mA max. (See note 8.) |   |                                |  |
| Undervoltage alarm indication (See note 4.)           |  | No   | Yes (selectable)  |   | No                             | Yes (selectable)   |                        | No                             | Yes (selectable)   |   |                                |  |
| Undervoltage alarm output terminals                   |  | No   | Yes (open collector output), 30 VDC max., 50 mA max. (See note 8.)  |   | No                             | Yes (open collector output), 30 VDC max., 50 mA max. (See note 8.) |                        | No                             | Yes (open collector output), 30 VDC max., 50 mA max. (See note 8.) |   |                                |  |
| Parallel operation                                    |  | No   |   |   |                                |  |                        |                                |  |   |                                |  |
| Series operation                                      |  | Yes for up to 2 Power Supplies (with external diode) |   |   |                                |  |                        |                                |  |   |                                |  |
| Other   | Operating ambient temperature                  |  | Refer to the derating curve in <i>Engineering Data</i> . (with no icing or condensation)  |   |                                |  |                        |                                |  |   |                                |  |
|   | Storage temperature                            |  | -25 to 65°C   |   |                                |  |                        |                                |  |   |                                |  |
|   | Operating ambient humidity                     |  | 25% to 85% (Storage humidity: 25% to 90%)   |   |                                |  |                        |                                |  |   |                                |  |
|   | Dielectric strength                            |  | 3.0 kVAC for 1 min. (between all inputs and outputs/ alarm outputs; detection current: 20 mA)<br>2.0 kVAC for 1 min. (between all inputs and PE terminals; detection current: 20 mA)<br>1.0 kVAC for 1 min. (between all outputs/ alarm outputs and PE terminals; detection current: 20 mA)<br>500 VAC for 1 min. (between all outputs and alarm outputs; detection current: 20 mA) |   |                                |  |                        |                                |  |   |                                |  |
|   | Insulation resistance                          |  | 100 MΩ min. (between all outputs/ alarm outputs and all inputs/ PE terminals) at 500 VDC  |   |                                |  |                        |                                |  |   |                                |  |
|   | Vibration resistance                           |  | 10 to 55 Hz, 0.375-mm single amplitude for 2 h each in X, Y, and Z directions<br>10 to 150Hz, 0.35-mm single amplitude (5 G max.) for 80 min each in-X, Y, and Z directions   |   |                                |  |                        |                                |  |   |                                |  |
|   | Shock resistance                               |  | 150 m/s <sup>2</sup> , 3 times each in ±X, ±Y, and ±Z directions  |   |                                |  |                        |                                |  |   |                                |  |
|   | Output indicator                               |  | Yes (color: green)  |   |                                |  |                        |                                |  |   |                                |  |
|   | EMI  | Conducted Emissions                                  | Conforms to EN61204-3 EN55011 Class A and based on FCC Class A<br>Conforms to EN61204-3 EN55011 Class B (See note 9.)   |   |                                |  |                        |                                |  |   |                                |  |
|   |  | Radiated Emissions                                   | Conforms to EN61204-3 EN55011 Class A<br>Conforms to EN61204-3 EN55011 Class B (See note 9.)  |   |                                |  |                        |                                |  |   |                                |  |
|   | EMS  |  | Conforms to EN61204-3 high severity levels  |   |                                |  |                        |                                |  |   |                                |  |
|   | Approved standards                             |  | UL: UL508 (Listing), UL60950<br>cUL: CSA C22.2 No.14, No.60950<br>EN/VDE: EN50178 (=VDE0160), EN60950 (=VDE0805)<br>SELV (EN60950/UL50178/UL60950-1)<br>According to VDE0106/P100, IP20   |   |                                |  |                        |                                |  |   |                                |  |
|   | Weight   |  | 550 g max.  |   |                                | 850 g max.   |                        |                                | 1,150 g max.   |   |                                |  |



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